XV.

CONTRIBUTIONS FROM THE CHEMICAL LABORATORY OF HARVARD COLLEGE.

A NEW METEORIC IRON FROM STUTSMAN COUNTY, NORTH DAKOTA.

By Oliver Whipple Huntington, Ph. D.

Presented December 10, 1890.

I lately received, through the kindness of Professor Alfred J. Moses, of the School of Mines, Columbia College, an undescribed specimen of meteoric iron of special interest.

It was found in November or December, 1885, during the construction of the James River Valley branch of the Northern Pacific Railroad, about fifteen or twenty miles southeast of Jamestown, Stutsman County, North Dakota.

It was found by one of the workmen, who gave it to Mr. John W. Gilbert, conductor of the construction train, saying he had taken it out of a slanting hole within five feet of the track. It is now impossible to find the exact locality, since the road was laid through new country, away from wagon roads or trails, and no particular attention was given to the matter at the time.

The specimen weighs 4,015 grams, and is of peculiar shape and appearance. As is well known, most of the meteoric irons which have been collected and recorded appear to be angular fragments of larger original masses; but the iron under discussion appears like a thick scale or splinter, which must have been blown off from the spherical surface of a large body, since the entire specimen is curved. Through the centre runs quite a thick zone which gradually narrows down to sharp edges on all sides, these edges forming, however, a continuous curved outline, with no jagged points or projections, as shown in Figures 1 and 2, reproduced from photographs of the specimen. The greatest length of the splinter is 26 cm.; greatest width 13 cm., but only 3.7 cm. through the thickest central portion, while the average thickness is not half as great. Furthermore, the exterior shows two utterly different surfaces. The convex side, which

must have formed the crust of the original mass, appears quite smooth except for a succession of small pittings, in the centre of each of which appears a little drop of chloride of iron, making it rust rapidly, and so causing little scales to flake off, thus possibly producing the depressions. This surface is the one shown in Figure 1. On the other hand, the concave side of the specimen is characterized by a vesicular structure not unlike certain furnace specimens, some of the cavities being about two centimeters across and nearly as deep. These cavities seem to be distributed with some regularity in three more or less parallel zones across the shorter dimension of the surface. Figure 2 is intended to show this feature of the specimen. These cavities appear to have no connection with the pittings of the surface, and are different from anything I have observed in the meteoric irons which have come under my notice. They seem to suggest an evolution of gas from the material in process of cooling, which may have been the cause of the splitting off of the specimen from the original mass.

In order to examine the structure, the iron was sawed through the thickest part by means of a toothless band saw fed with emery; but when the cut had come within an inch of the opposite edge, the remaining portion was forcibly broken in order to bring out the characters of the fracture, when the iron showed a somewhat new feature. The metal was so malleable, that, though the connecting surface had an area of a square inch, the two portions could be bent and twisted quite readily, almost like masses of lead, but it was very difficult to make it break; and when at last the two portions separated, the fracture showed no crystalline structure whatever, but only irregularly curved surfaces like a perfectly plastic material.

The author has shown in a previous paper,* that even the most malleable meteoric irons, when broken under the hammer, usually exhibit very striking peculiarities of cleavage parallel to certain crystalline faces, and that even in such compact irons as those of Bates County and Coahuila large cleavage crystals could be broken out from the mass; and the characters exhibited by the cleavage were suggested as a possible means of distinguishing different meteoric irons where other methods proved insufficient. Hence the fracture of the Stutsman County iron was a complete surprise, and in order to study it further it was mounted in the vice and broken in various directions, but no trace of cleavage could be produced. When the

* These Proceedings, vol. xxi. p. 478, May 12, 1886.

thin edge was held in the vice, the mass could be readily bent back and forth with the hand, and it invariably broke like a soft semi-solid material. Moreover, the iron was so malleable that it could be readily rolled out into thin ribbon in the cold. Such extreme malleability and the peculiar fracture separate this iron from all others with which I am familiar.

One would naturally expect from the foregoing characteristics that the Stutsman County iron would show no crystalline structure when acted on by dilute nitric acid, but when the cut surface was polished and etched, it gave typical Widmanstättian figures, showing how-

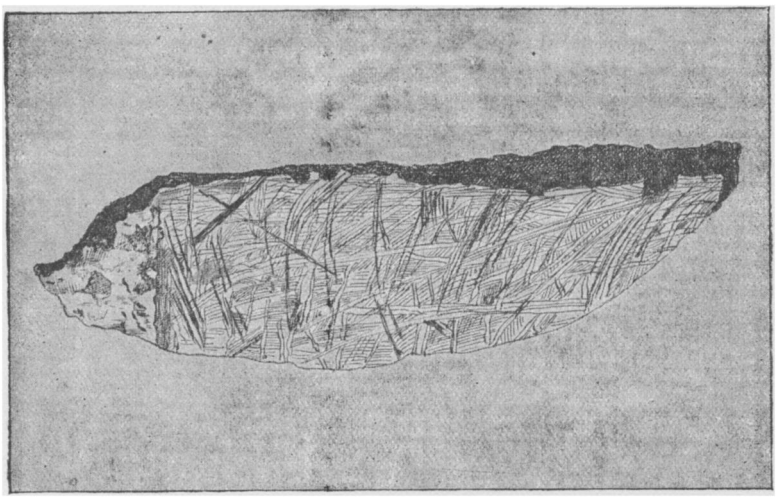

FIG. 3.

ever plates not over one millimeter thick, closely interlaced, frequently bent, and occasionally intersected by linear inclusions of troilite two or three centimeters long. The figures closely resemble those of Oldham County, and are not unlike those of Obernkirchen, being so closely interlaced as to appear somewhat confused until carefully examined. On first etching the iron, there is a blackening of the surface, as in the case of steel, which gives for the moment prominence to the figures; the superficial deposit is easily rubbed off, however, when the surface appears bright and shining, but the figures indistinct. Figure 3 is copied from a drawing of the etched surface, and shows at one end the peculiar fracture already described.

I have not yet been able to make a thorough examination of the

chemical composition of the iron, but hope to do so later, in connection with some other meteorites. A preliminary analysis, however, gave the following results.

Iron	90.24
Nickel	9.75
Phosphorus	.05
Copper	trace
	100.04

A specimen of the iron weighing nearly two grams was examined for sulphur, but showed no trace.

The points of special interest in the Stutsman County iron are: —

First, that it was found at the bottom of a slanting hole rendering it probable that it belonged to a comparatively recent fall.

Secondly, its peculiar shape, making it appear like a scale split from the surface of a spherical body.

Thirdly, its extreme malleability and peculiar fracture.

Lastly, the vesicular structure of a portion of the surface.